

JIMMA UNIVERSITY
INSTITUTE OF HEALTH
FACULTY OF MEDICAL SCIENCE
DEPARTMENT OF PEDIATRICS AND CHILD HEALTH



**MAGNITUDE AND ASSOCIATED FACTORS OF ANXIETY AND DEPRESSION
AMONG CHILDREN WITH EPILEPSY AGE 8-18 YEARS ON FOLLOW UP AT
JUMC, SEIZURE FOLLOW UP CLINIC, SOUTH WEST ETHIOPIA.**

BY: MILKI TUFA (MD, PEDIATRICS RESIDENT)

**A THESIS TO BE SUBMITTED TO THE DEPARTMENT OF PEDIATRICS AND
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JIMMA, ETHIOPIA**

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DECLARATION

Assurance of principal investigator

I agree to accept responsibility for the scientific, ethical and technical conduct of the research project & for provision of required progress report as per terms and condition of the college of health sciences I effect at the time of grant is forwarded as the of this application.

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Approval of the advisors

This thesis proposal has been submitted with my approval as university advisor

Name of the advisors	Date	Signature
Dr. Amina Menbere (MD)	_____	_____
Mr. Liyew Agenagnew	_____	_____

ABSTRACT

Background: Epilepsy is a common neurological condition, with close to 80% of people living with epilepsy residing in developing countries. Approximately half of epilepsy in the population occurs during childhood. Epidemiologic studies internationally have shown a strong association between pediatric epilepsy and mental disorders. However, there is limited research on this topic regionally and locally.

Objective: The aim of the study was to assess magnitude and associated factors of anxiety and depression among children with epilepsy age 8-18 years on follow up at JUMC, seizure follow up clinic, south west Ethiopia.

Methods: Hospital based prospective cross-sectional study was conducted to assess magnitude and associated factors of anxiety and depression among children with epilepsy age 8-18 years on follow up at JUMC, seizure follow up clinic. All children with age 8-18 years who are on follow up at JUMC, and fulfilled inclusion criteria were tried to include in the study during study period. Data was collected by using semi-structured pre-tested questionnaire and Additionally, Revised Child Anxiety and Depression Scale (RCADS) was used as screening tool. A consecutive sampling technique will be used to include all (163) children. The data on the questionnaire was entered into Epi data version 6 and double entry verification was made, and then exported to SPSS version 26 for analysis. Univariate and multivariate logistic regression analysis was done to identify covariates associated with the outcome variable. Statistical significance was considered at a p-value of less than 0.05.

Results: Children aged 8-18 years were enrolled based on inclusion criteria. A total of 118 children were included in this study. The study revealed that the majority of participants were male 69(58.5%) and 89(75.4%) of them were below age of 14 years. The mean age of the study participants was 12.20 + 2.863 years. From which 36(30.5%) of them had anxiety and 20(16.9%) of them had depression while and both anxiety and depression identified in 9(8%) % of children. The odds of being first diagnosed at 6 months up to 1 year was 95.8% less likely to develop anxiety compared with those first diagnosed greater than one year (AOR; 0.042, CI; 0.004, 0.400, P=0.006). The odds of being taking monotherapy was 90.2% times less likely develop anxiety as compared with those who take polytherapy (AOR; 0.098, CI; 0.028, 0.345, P=0.001). Factors associated with depression is being the odds male was 5 times more likely to have depression as compared with being female AOR= 5.392, CI: 1.121, 25.947; P= 0.036), similarly, the odds of being age less than 14 was 80.2% less likely to develop anxiety and depression at a time as compared with age greater than 14 years old (AOR= 0.198, CI: 0.041, 0.960, P= 0.044). Finally, the odds of being have a good relationship between mother and father or guardians was 88.6% less likely to develop anxiety and depression as compared to poor relationship between mother and father or guardians (AOR = 0.114, CI: 0.016, 0.819, P = 0.03).

Conclusion: This study has found out that significant number of CWE under our care also have a co morbid behavioral disorders. Physicians attending to these adolescents should therefore carefully evaluate them with respect to the possible risk factors. This can easily be minimized by regular assessment and addressing the problem early.

Keywords: Epilepsy, anxiety, depression, Children, Adolescents, JUMC

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ABBREVIATION AND ACRONYMS

AED: Anti-epileptic drug

ADD: Attention deficit disorder

ADHD: Attention-deficit hyperactivity disorder

CD: Conduct Disorder

CDIS: Child Depression Inventory scale

CI: Confidence Interval

CWE: Children with epilepsy

DD: Depression Disorder

DICA: Diagnostic Interview for Children and Adolescents

DISC-IV: Diagnostic Interview Schedule for Children Version IV

DSM: Diagnostic and Statistical Manual

DSRSC: Depression Self-Rating Scale for Children

JUMC: Jimma university medical center

ODD: Oppositional Deviant Disorder

PSTD: Post Traumatic Stress Disorder

RCADS: Revised Child Anxiety and Depression Scale

SDQ: Strength and difficulties questioner parent version

STAI-C: State-Trait Anxiety Inventory for Children French version

TASH: Tikur anbessa specialized hospital

U.K: United Kingdom

WHO: World Health Organization

CHAPTER ONE

INTRODUCTION

1.1. Background

Epilepsy is a disorder of the brain characterized by an enduring predisposition to generate seizures and by the neurobiological, cognitive, psychological, and social consequences of this condition [1]. For epidemiologic and, commonly, for clinical purposes, epilepsy is considered present when two or more unprovoked seizures occur in a time frame of longer than 24 hrs. [2].

According to WHO 2019 estimate 50 million people worldwide live with epilepsy, of whom nearly 80% live in low- and middle-income countries. More than 5 million new cases are diagnosed each year, and this is expected to increase further. Epilepsy accounts for more than 0.5% of the total global burden of disease [3]. In Ethiopia an estimate of 400,000 people lives with epilepsy of which 85% are children and only 3% of them get treatment due to associated stigma with the disease and due to other social and economic factors [4].

National population-based studies from western countries show that 20-30% of adolescents have a chronic illness and 10-13% of those adolescent's report having a chronic illness that substantially limits their daily life or requires extended periods of care and supervision. Rates of psychiatric disorder are up to four times greater in children with chronic physical illness than in children who are physically well [5].

Epilepsy is the most common neurological disorder in children, and its prevalence in childhood is estimated to be 0.05–1%. Among these children, up to 28.6% may have coexisting psychiatric conditions. This increases to 58.3% in children with a known neuro logical disorder that may cause or be associated with epilepsy [6].

As Diagnostic Statistical Manual of mental disorders DSM -5 definition “psychiatric disorders is a syndrome characterized by clinically significant disturbance in an individual’s cognition, emotion regulation, or behavior that reflects a dysfunction in the psychological, biological, or developmental processes underlying mental function.” [7].

The development of behavioral abnormalities in epileptic children is multifactorial. Central nervous system damage is one of the major risk factors identified. More than half of children with epilepsy and additional evidence of CNS dysfunction have significant behavioral problems. In different studies early age at onset was mainly associated with cognitive impairment rather than with behavioral abnormality. The seizure type and frequency were also studied to show that behavioral abnormalities to be more common in those with poorly controlled or intractable seizure and in those with new onset epilepsy. The role of antiepileptic drugs in the development of behavioral problem as described in many studies is not significant. However, the uses of phenobarbital and benzodiazepines have been associated with reports of hyperactivity [8].

Psychosocial factors may also contribute to the development of behavioral problems. Children living in stress full environment, presence of poor communication within the family and the

child's negative attitude towards the illness especially in adolescents may predispose to development of behavioral abnormality [9].

A number of psychiatric and neuropsychiatric disorders have been found to occur at a higher rate in children and adolescents with epilepsy. These include mental retardation, autism, attention problems and/or attention-deficit/hyperactivity disorder (ADHD) [15,16], depression, anxiety, and psychotic disorders. Among these comorbid conditions, depression and anxiety seem to be highly common [6].

Mood disorders and anxiety are also observed in adolescent age group, with approximately one-fourth of them exhibit symptoms of depression and significant proportion of these children will experience either anxiety or depression [10].

Mental health conditions such as anxiety or depression can also be a result of increased stressors or what is referred to as increased allostatic load. This can be due to societal or family rejection and poor self-image, or repeated hospitalizations, especially when they involve long separations from family supports and painful or traumatic treatments and of course to any other adverse childhood experiences [11].

Pediatric epilepsy is of particular concern to psychiatrists due to the high frequency of associated mental problems, including psychiatric and neurodevelopmental disorders, and psychosocial problems. Children with epilepsy have also been found to be at an increased risk for unmet mental health needs [12].

The impact of Behavioral problems that appear in early childhood usually will extend in to adult life progressing in to a psychiatric disorder [13]. Identifying and addressing these problems early will have a significant positive effect on seizure control, school performance and social interaction as well as on relieving the stress on parents and also on preventing development of more severe form of psychiatric disorders [14].

1.2. Problem statement

Various worldwide investigations focusing on the prevalence of psychopathology in pediatric epilepsy have documented that children with epilepsy have an estimated overall risk of 21–60% for childhood psychopathology. This is at least three to six times higher than the risk for psychopathology in the general population (i.e., 6.6%) and among children with a chronic medical condition not involving the central nervous system (i.e., 11.6%). Depression symptoms alone have an estimated prevalence of 23–26%, based on self-report instruments. The prevalence of anxiety, in comparison, is estimated to be between 15 and 20% [6].

In developed countries clinic-based studies shows, the prevalence of anxiety in children with epilepsy is around 30 to 35%, while the prevalence of depression is near 12.7 to 36.5%. Unfortunately, however, these conditions are often unrecognized and left untreated in children with epilepsy, which can lead to negative outcomes on quality of life [15].

Another population based studies in developed countries have revealed a prevalence of lifetime depression in epilepsy of almost 13-20%. The risk of depression in adolescents is higher when epilepsy is also associated with lower cognitive functioning, language disorders and lower scores in specific neuropsychological domains. The first step to be considered for the management of depressive disorder in adolescents with epilepsy is to consider potential reversible causes of anxiety and depression (i.e., a new AEDs; seizure control). Secondly, great attention has to be given to the education of the child/adolescent and his/her family, trying to improve knowledge about epilepsy as well as to decrease parental stress and improving the child's sense of competence [16].

In African countries studies shows the prevalence of anxiety and depression ranges from 3-42% and 21-29% respectively [17, 18]. The burden of psychiatric comorbidity in children and adolescents with epilepsy is significant, leading to increased morbidity and impact on patients and their families. It is also clinically significant, as it complicates the management of epilepsy. Clinicians may not recognize the complex relationship between psychiatric symptoms, epilepsy, and medications used to treat it. Any additional medications that are prescribed to manage psychological symptoms, aside from having inherent individual risk profiles, may further contribute to drug burden and drug interactions with existing antiepileptic medication regimens [19].

In recent years has shed light on both the prevalence of emotional problems in youth with epilepsy and the safety and efficacy of treatment options. A number of challenges exist in treating patients with epilepsy. This is particularly true when seizures are difficult to control and medication regimens are more complex. Some pharmaceutical options may provide assistance with both seizures and emotional distress, but care is needed when considering such treatment approaches. In addition, integration of mental health professionals into the care of patients is necessary when cases are complicated and risk factors are high. Thorough methods to accurately diagnose emotional conditions and regular monitoring of symptoms can help prevent serious problems that can negatively affect the success of children and adolescents in everyday life. Collaboration between disciplines offers the best hope for early identification and treatment of this conditions [6].

In our country, care of these children is provided mainly by psychiatry specialized nurses, general practitioners, psychiatrists, pediatricians and neurologists without a strong established coordination and use of screening technique for this comorbidity. The follow up mainly focuses on seizure control and seems to undermine the significant overlapping co morbid psychiatric problems these children may face, and however, few studies have been done in Africa, and specifically in Ethiopia on the association between pediatric epilepsy and psychiatric problems [20].

A multidisciplinary approach is recommended in the diagnosis and treatment of childhood psychological disorders. Psychologists frequently provide parent education in behavior management, teacher education, counseling for the child and strategies to assist with learning difficulties [21].

1.3. Significance of Study

Integrating mental and physical health care is a challenge, but it is a key to improving the long-term prognosis and quality of life of children with chronic conditions. It behooves all those who are involved in the care of children with chronic physical health conditions to take an integrated family-centered approach and partner with families in caring for children's physical and mental health in order to optimize their care and their future health and well-being [22].

This study can give an insight about the magnitude of the co-morbid psychiatric problem and help to expand the care provided to epileptic children. It can also be used to fill the gap and help to assess the children under follow up at JUMC for common mental problems like anxiety and depression using a standardized questioner developed and used for this purpose

Furthermore, since there was limited research on the topic in our setup, the generated new data on the comorbidities of behavioral problems in children with epilepsy may be used to strengthen the need to establish a coordinated management between the different specialties (psychiatry and each follow clinic) for providing a better quality care for patients.

CHAPTER TWO

2.1 LITERATURE REVIEW

General overview

A substantial research base over the past 30 years has demonstrated that children with chronic health conditions are at increased risk for mental health problems, as shown by meta-analytic studies, epidemiological studies and studies of clinical samples [23]. Children with epilepsy (CWE) are observed to have increased incidence of psychiatric disorders as compared to the normal population as well as with children having other chronic diseases not involving the CNS. Population based studies from developed countries confirm at least 30% of CWE have a concomitant psychiatric diagnosis. The usual behavioral abnormalities are particularly related to social activity, attention, and problem solving [10, 30, 31].

Magnitude of anxiety and depression in children with epilepsy

One of the original community-based studies on the association between psychopathology and pediatric epilepsy age 6-12 years old was done in 1970, in London. It reported a prevalence of emotional and behavioral disorders of 6.6% in the general childhood population as compared to 28.6% in children with epilepsy. Children known to have central nervous system (CNS) dysfunction of any etiology were seen to have a higher prevalence of the problems of 37.5%. The highest prevalence of behavioral and emotional problems was seen in children with both seizure disorders and CNS complications [18]. Case control study done in USA, 1984 was compared children with epilepsy, diabetic children and children in the general population. The prevalence of psychiatric disturbance was highest in epileptic children (45% in new-onset epilepsy and 48% in chronic epilepsy), as compared to 17% of diabetic children and 10% of the controls [24].

Case control study was done to assess magnitude of depression in adolescents with epilepsy aged 12 to 17 years attending neurology clinic at Department of Pediatric Neurology, Ancona Italy, in 2019. 143 adolescents were involved and they were screened by Neurological Disorders Depression Inventory for Epilepsy (NDDI-E) questionnaires. The prevalence of depressive disorders in adolescents with epilepsy ranges between 8 and 35% and is higher than the general population of the same age [16].

Cross-sectional study was done to assess prevalence of depression and anxiety among children with epilepsy and determines which demographic variables and comorbidities increase the risk of these psychopathologies in 2009 to 2010, in New York, USA. 1,042 children aged 5-17 year were included in the study. The screen was done by asking parent/guardian for presence of depression and the presence of anxiety. Two questions determined whether the child currently had depression: one asked "Has a doctor or other medical provider ever told you that [the child] had depression?" and a second asked "Does [the child] currently have depression?". The parent/guardian needed to respond "yes" to both questions for the child to be deemed to have depression, anxiety and if the child had both anxiety and depression in the analyses. The study showed 13.1 % have depression and 23.3 % have anxiety while 11.5% for both. The prevalence depression lower than (1.6%) study done in Italy (8-35%) [16, 25].

Another cross-sectional study done at Tuen Mun Hospital in Hong Kong, in 2015. Total of 140 adolescents (71 boys and 69 girls) aged 10 to 18 years were recruited from patients who attended the neurology outpatient clinic. The assessment was done by Hospital Anxiety and Depression Scale Anxiety Subscale. Of which 32.8% had anxiety and 22.1% had depression [26].

Cross-sectional study was done to assess prevalence of depression among children with epilepsy and evaluated factors associated with depression in 2018, at the Pediatric Neurology Department of the West China Women's and Children's Hospital, China. Depression status among children with epilepsy was evaluated by the Depression Self-Rating Scale for Children (DSRSC). A total of 124 patients participated in the study, of which 60.5% (75/124) were males and (59) 39.5 % were females and the mean age of patients was 11.17 ± 2.29 years. In this study 16.9% (21/124) of children with epilepsy were considered to have depression. According to this study prevalence depression was lower than those study done in Hong Kong 32.8%, Italy (8-35%) and higher than study in done New York(1.6%) [16, 25, 26, 27].

Cross-sectional study on children with epilepsy aged 7 to 17 years attending neurology clinic at Yalagdo Ouedraogo University Teaching Hospital, Burkina Faso, during the period of May 06 to August 6, 2019. The State-Trait Anxiety Inventory for Children French version (STAI-C) was used for the assessment of anxiety and the Child Depression Inventory scale translated into French (CDI) for the assessment of depression. 45 children with epilepsy were included in the study, and mean age was 10.86 ± 3.30 years. 27 (60%) children were boys. Anxiety disorders were present in 19 (42.2%) patients and depression was present in 12 patients (26.7) [17].

Institutional based cross-sectional study was done to assess prevalence and risk factors for anxiety and depressive disorders in Nigerian, 2005. 102 adolescents with epilepsy aged between 12 and 18 were assessed for anxiety and depressive disorders with the Diagnostic Interview Schedule for Children Version IV (DISC-IV). An anxiety disorder was diagnosed in 32 (31.37%) of the adolescents and a depressive disorder was reported in 29 (28.43%). The prevalence anxiety was lower than (31.37%) study done in Burkina Faso (42.2%), while the prevalence of the depression was higher than (28.43%) study done in Burkina Faso (26.7%) [18].

A facility based cross sectional study was carried out in Addis Ababa from February 1- June 30, 2014G. The study was included 384 children age 5-15 years old epileptic children who visited TASH pediatrics seizure follow up clinic at TASH. In this study 36.2% of the CWE shows abnormal score by SDQ screening tool. Peer relationship, prosocial, hyperactivity, conduct and emotional problem was identified [28].

Associated factors of anxiety and depression in children with epilepsy

Case control study was done to assess magnitude of depression in adolescents with epilepsy aged 12 to 17 years attending neurology clinic at Department of Pediatric Neurology, Ancona Italy, in 2019. 143 adolescents were involved and they were screened by Neurological Disorders Depression Inventory for Epilepsy (NDDI-E) questionnaires. Depressive disorders are associated with poor seizure control by antiepileptic drugs (AEDs), young age disease onset disease and lower educational level [16].

Cross-sectional study was done to assess prevalence of depression and anxiety among children with epilepsy and determines which demographic variables and comorbidities increase the risk of these

psychopathologies in 2009 to 2010, in New York, USA. 1,042 children aged 5- 17 year were included in the study. The screen was done by asking parent/guardian for presence of depression and the presence of anxiety. Two questions determined whether the child currently had depression: one asked “Has a doctor or other medical provider ever told you that [the child] had depression?” and a second asked “Does [the child] currently have depression?”. The parent/guardian needed to respond “yes” to both questions for the child to be deemed to have depression, anxiety and if the child had both anxiety and depression in the analyses. In this analysis of children with epilepsy, low- income children (regardless of race) were more likely to have depression. Gender, age, and epilepsy severity were unrelated to depression or anxiety [25].

In cross-sectional study done at Tuen Mun Hospital in Hong Kong, in 2015. Total of 140 adolescents (71 boys and 69 girls) aged 10 to 18 years were recruited from patients who attended the neurology outpatient clinic. The assessment was done by Hospital Anxiety and Depression Scale Anxiety Subscale. Factors associated with anxiety were older age at the time of the study and polytherapy. Adolescents who had been seizure-free for 12 months or more at time of the study were less likely to experience anxiety and medical comorbidities, female gender, frequent seizures, and younger age of seizure onset were associated with depression. A common risk factor for both anxiety and depression was the duration of epilepsy. Anxiety and depression were also highly associated with each other [26].

Cross-sectional study was done to assess prevalence of depression among children with epilepsy and evaluated factors associated with depression in 2018, at the Pediatric Neurology Department of the West China Women’s and Children’s Hospital, China. Depression status among children with epilepsy was evaluated by the Depression Self-Rating Scale for Children (DSRSC). A total of 124 patients participated in the study, of which 60.5% (75/124) were males and (59) 39.5 % were females and the mean age of patients was 11.17 ± 2.29 years. According to this study multiple linear regression analysis showed, there was a significant correlation with adverse reaction to medications, comorbidities and those care takers had negative attitudes towards seizures [27].

Institutional based cross-sectional study was done to assess prevalence and risk factors for anxiety and depressive disorders in Nigerian, 2005. 102 adolescents with epilepsy aged between 12 and 18 were assessed for anxiety and depressive disorders with the Diagnostic Interview Schedule for Children Version IV (DISC-IV). Associated factors of anxiety and depressive disorders was include uncontrolled seizures, polytherapy, and parent’s psychopathology [18].

Cross-sectional study on children with epilepsy aged 7 to 17 years attending neurology clinic at Yalagdo Ouedraogo University Teaching Hospital, Burkina Faso, during the period of May 06 to August 6, 2019. The State-Trait Anxiety Inventory for Children French version (STAI-C) was used for the assessment of anxiety and the Child Depression Inventory scale translated into French (CDI) for the assessment of depression. 45 children with epilepsy were included in the study, and mean age was 10.86 ± 3.30 years. 27 (60%) children were boys. Low educational status and long duration of epilepsy were factors related to anxiety and depression [17].

A facility based cross sectional study was carried out in Addis Ababa from February 1- June 30, 2014G. The study was included 384 children age 5-15 years old epileptic children who visited TASH pediatrics seizure follow up clinic at TASH. In this study 36.2% of the CWE shows abnormal score by SDQ screening tool. Low family income, poor seizure control, young age (1st year) onset of seizure and type of seizure (absence) was associated [28].

Conceptual frame work of the study

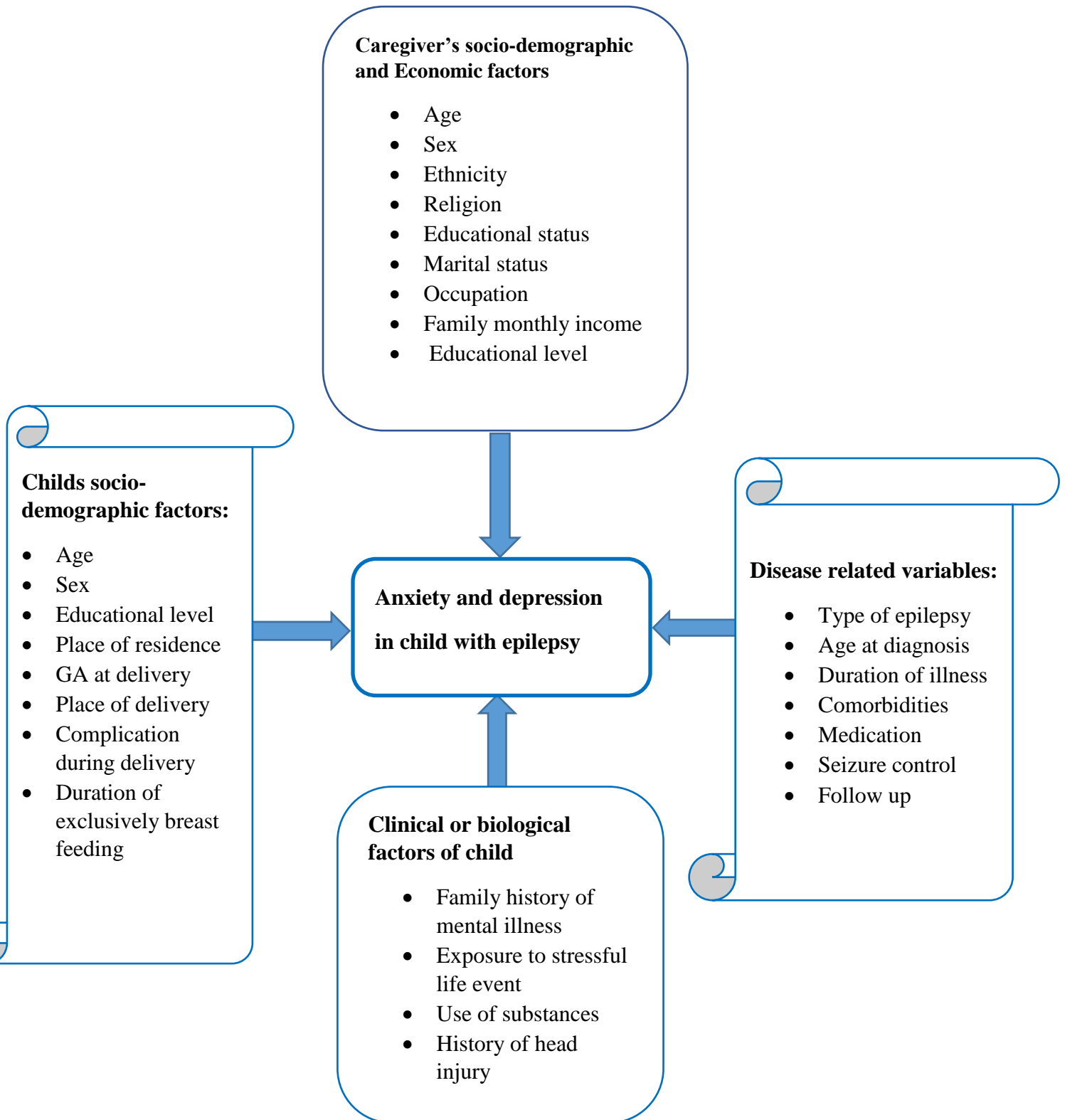


Figure 1: Conceptual frame work of the study

CHAPTER THREE

OBJECTIVE OF THE STUDY

3.1 GENERAL OBJECTIVE

To assess magnitude and associated factors of anxiety and depression among children with epilepsy age 8-18 years on follow up at JUMC, seizure follow up clinic, south west Ethiopia.

3.2 SPECIFIC OBJECTIVE

To determine magnitude of anxiety among children with epilepsy age 8-18 years on follow up at JUMC, seizure follow up clinic, south west Ethiopia

To determine magnitude of depression among children with epilepsy age 8-18 years on follow up at JUMC, seizure follow up clinic, south west Ethiopia

To determine magnitude of anxiety and depression among children with epilepsy age 8-18 years on follow up at JUMC, seizure follow up clinic, south west Ethiopia.

To identify associated factors of anxiety and depression among children with epilepsy age 8-18 years on follow up at JUMC, seizure follow up clinic, south west Ethiopia.

CHAPTER FOUR

METHODOLOGY

4.1 Study area

The study was conducted in Jimma University medical center, which is located in south western part of Ethiopia, Oromia region, 352km from Addis Ababa. It has altitude of 1780 meters above the sea level. JUMC serve a total almost 20 million catchment population from Jimma zone, Ilu Aba Bor, Buno-Bedele, Gambela and Southern nation nationality population. Besides providing clinical services for patients, the center hosts several undergraduate and post graduate programs in the field of basic sciences as well as clinical medicine. The study will be conducted at the seizure follow up clinic, where children with different types of chronic diseases are seen.

4.2 Study period

The study was conducted from May1 to July 31, 2022

4.3 Study design

Institution based cross-sectional study design was employed.

4.4 Population

4.4.1 Source population

All children and adolescents diagnosed with epilepsy and registered at JUMC.

4.4.2 Study population

All children and adolescents age 8-18 years old diagnosed with epilepsy for more than 6 months and who are on follow up at seizure follow up clinic of JUMC and who fulfill the inclusion criteria were participated in the study.

4.5 Inclusion and exclusion criteria

4.5.1 Inclusion criteria:

- All children and adolescents with epilepsy, who are 8-18 years old and diagnosed with epilepsy at least for last 6 months and/or who are on follow up at seizure follow up clinic of JUMC.

4.5.2 Exclusion criteria:

- Children with hearing and language impairment.
- Children who are not willing to be involved in the study.
- Primary care who denied to be involved in the study
- Children diagnosed with epilepsy for less than 6 months.

4.6 sampling

4.6.1 Sample size determination

The required sample size for this study was determined by using single population proportion estimation formula and considering the following assumptions:

$$N_o = \frac{[(Z_{1-\alpha/2})^2 pq]}{d^2}$$

Where

No = Initial/Desired sample size.

d = Precision of measurement (acceptable marginal error) = 0.05

($Z_{1-\alpha/2}$)= the critical value at 95% level of significance (1.96)

P = 50% no similar study founded.

q = 1-p =50%.

NR = Non response Rate

Hence; $No = \frac{(1.96)^2 0.5 (0.5)}{(0.05)^2}$, No = 343

Since the source population is < 10,000; final sample size is determined by applying the finite population correction formula and adding 10 % non-response rate. Accordingly, the calculated final sample size became.

$$Nf = \frac{No}{1 + \{(No-1)/N\}}$$

Where

No = Initial sample size (343)

Nf = final sample size

N = total number of children and adolescents age 8-18 years old diagnosed with epilepsy for more than 6 months and who are on follow up at seizure follow up clinic of JUMC and are registered at seizure follow up clinic of JUMC, which around 163.

NR = Non response rate

$$\text{Hence, } Nf = \frac{343}{1 + \{(343-1)/163\}} = 153$$

By taking 10% NR; the final sample size becomes 122.

Since total no of patients are small, 11 of CWE who fulfilled inclusion criteria (163) was tried to included but only 118 of them participated in study period.

4.6.2 Sampling method

A consecutive sampling technique consecutive sampling technique was employed.

4.7 Study variables

4.7.1 Dependent variables

Magnitude of anxiety and depression

4.7.2 Independent variables

Child's socio-demographic factors: Age, sex, educational status, place of residence, relationship with siblings or parents, religious attending

Caregiver's socio-demographic and economic factors: Primary caregiver, age, sex, religion, educational status, marital status, family size, occupation, family income, relationship with child or spouse, religious attending, expectation they on their child conditions

Disease related variables: Type of epilepsy, age at diagnosis, duration of illness, comorbidities, medication, seizure control, follow up.

Clinical and biological factors of child: GA at delivery, Place of delivery, Complication during delivery, Duration of exclusively breast feeding, Family history of mental illness, exposure to stressful life event, substances use, history of head injury

Operational definitions

Caregivers/ guardian: An individual, such as a family member or other person who takes care of a child or adolescent.

Child with epilepsy: Patients diagnosed with epilepsy for more than 6 months and/or who are on follow up at seizure follow up clinic of JUMC.

Epilepsy: At least two unprovoked seizures occurring >24 hours apart or diagnosis of an epilepsy syndrome

Controlled epilepsy: Seizure free for 6 months or more.

Poor controlled epilepsy: One or more seizure per month over a period of 6 months or more.

Monotherapy: Use of single anti-epileptic drug to control epilepsy

Polytherapy: Use of 2 or more anti-epileptic drug to control epilepsy

Family history of mental illness: Information either subjectively told or medically confirmed any of mental health problem manifestation in child family or relative.

Severe wasting: Is defined by very low weight for height/length (below -3z scores) of the Median WHO growth standards

Moderate wasting: Is defined by very low weight for height/length (below -2z scores) of the Median WHO growth standards

Ever use substances: In this study it is defined as use of at least one of specified substance (cigarette, alcohol, khat, and other substances) even once in life time

Stressful life events: The presence of stressful life events explained by experienced one or more stressful life events in the last 6 months.

1. Loss of loved ones: If a family member or someone close to the respondent died within the last 6 months.
2. Financial stress: If one lost his/her job or he/she had experience hunger due to lack of money within the last 6 months.

4.9 Data collection method and material

4.9.1 Data collection material

Structured close ended multiple choice questioner was used to assess the caregiver's and patient's socio-demographic characteristics and disease related conditions of the children.

Additionally, Revised Child Anxiety and Depression Scale (RCADS) is used as a tool. It has a 47-item, youth self-report questionnaire with subscales including: separation anxiety disorder (SAD), social phobia (SP), generalized anxiety disorder (GAD), panic disorder (PD), obsessive compulsive disorder (OCD), and major depressive disorder (MDD). It also yields a Total Anxiety Scale (sum of the 5 anxiety subscales) and a Total Internalizing Scale (sum of all 6 subscales). Items are rated on a 4-point Likert-scale from 0 (“never”) to 3 (“always”) [29]

And also, the Revised Child Anxiety and Depression Scale-Parent Version (RCADS-P) similarly assesses parent report of youth’s symptoms of anxiety and depression across the same six subscales.

The RCADS and its related scales were developed using many of the items on the Spence Children’s Anxiety Scale along with items representing DSM Major Depression symptoms and new items related to general anxiety and negative affect. This short screening questionnaire is easy to use and can be completed in about 10-15 minutes. It is designed to be filled by self-report in 8-18 year olds [29]. The tool will be translated into local languages (Amharic and Afan Oromo).

4.9.2 Data collection method

The questioners were filled by two BSc nurses from psychiatry department under supervision of principal investigator.

4.9.3 Data quality assurance

To assure the quality of data, the following measure were being undertaken. Standard data collection instrument was used. The questionnaire was pretested on 5%(-) of the total sample size and clarity, length, completeness and consistency of language was checked.

The principal investigator closely supervised the activity on a daily basis. At the end of each data collection days, the principal investigator checked the completeness of filled questionnaires and whether recorded information makes sense to ensure the quality of the data collected. There was been meeting whenever necessary.

4.9.4 Data processing and analysis

The data collected was checked for completeness and consistency and then cleaned, coded, and entered into EpiData 6, exported, cleaned and analyzed using Statistical Package for Social Sciences (SPSS) version 26.0.

The univariate analysis such as proportions, percentages, ratios, frequency distributions and appropriate graphic presentations as well as measures of central tendency and measures of dispersion was used for describing data. Continuous variables expressed as mean and standard deviation values. Bivariate analyses were done and all covariates which had association with the outcome variables at p-value of 0.25 was selected for multivariable analyses. Then multivariable logistic regression carried out to identify an independent effect of the predictors that showed significant association with dependent variable. To evaluate the association between dependent and independent variables, both crude odds ratio (COR) and adjusted odds ratio (AOR) with 95% confidence interval will be reported.

4.10. ETHICAL CONSIDERATIONS

Ethical clearance was obtained from ethical review board for human studies of Jimma University and permission was obtained from the authorities of the hospital. Written consent was obtained from each study participant’s family or caregiver. Confidentiality was assured by collecting data anonymously. Children

with possible psychiatric problem will be linked to the psychiatric clinic starting from their next appointment for possible counseling and/treatment of their condition.

4.11. PLAN FOR DISSEMINATION OF RESULTS

The result of the study presented to the department of pediatrics and child health, Jimma University. The final result from the study submitted to the Research and Postgraduate Office, Jimma University in a form of a written report. Subsequently, the result of the study will be published in peer-reviewed journals.

CHAPTER FIVE

RESULTS

5.1 Socio-demographic characteristics among children with epilepsy for more than 6 months and who are on follow up at seizure follow up clinic of JUMC, 2022.

A total of 118 children were included in this study **with 100% response rate**. The study revealed that the majority of Participants were male 69(58.5%) and 89(75.4%) of them were below age of 14 years. The mean age of the study participants was 12.20 ± 2.863 years. Majority of them are from rural area 80(67.8% and 65(55.1%) of them were attended grade 3 & 4. 101(85.6%) of them live with their parents (Table-1).

Table 1: Socio-demographic characteristics of children with epilepsy for more than 6 months and who are on follow up at seizure follow up clinic of JUMC, 2022.

Variables		Frequency	Percent
Age	<14 yrs. Old	89	75.4
	14 yrs. Old	29	24.6
Sex	Male	69	58.5
	Female	49	41.5
Area of residency	Urban	38	32.2
	Rural	80	67.8
Education	3-4 grade	65	55.1
	5-6 grade	24	20.3
	7-8 grade	10	8.5
	9-10 grade	11	9.3
	11-12 grade	8	6.8
Whom do you live with	Parents	101	85.6
	Guardians	17	14.4
Only child for your family	Yes	12	10.2

	No	106	89.8
Birth order	1-2 birth order	34	28.8
	3-4 birth order	55	46.6
	=>5 birth order	29	24.6
How often do you attend religious services	Daily	12	10.2
	2-6 days /week	38	32.2
	Weekly	34	28.8
	Only holidays	21	17.8
	Never attend	13	11.0

Out of total study participants, only 4(3.4%) of them experienced negative things in their life, 70 (59.3%) have good relationship with their brother, sister, father or guardian and 95(80.5%) with mother. Majority of their mothers and fathers have good relationship with each other 78(66.1%). **Majority of the children are expected to have high self-care practice as well as high academic performance by their parents (74 (62.7%), 78(66.1%) respectively) (Table 2).**

Table 2: Socio-demographic characteristics of children with epilepsy for more than 6 months and who are on follow up at seizure follow up clinic of JUMC, 2022.

Variables		Frequency	Percent
Negative experience in your life	Yes	4	3.4
	No	114	96.6
If Yes, kind of experiences	Sexual	1	.8
	Other	3	2.5
Relationship with your brother, sisters or guardian	Good	70	59.3
	Intermediate	36	30.5
	Poor	12	10.2
Relationship with your father or guardians	Good	72	61.0
	Intermediate	40	33.9
	Poor	6	5.1
Relationship with your mother or guardians	Good	95	80.5

	Intermediate	23	19.5
Relationship between your mother and father or guardians	Normal	78	66.1
	Moderate wasting	30	25.4
	severe wasting	10	8.5
How much your parent or guardians expect from you on your self-care?	High	74	62.7
	Low	44	37.3
How much your parent or guardians expect from you on your academic performance?	High	78	66.1
	Low	40	33.9
How much your parent or guardians expect from you on your support parents on household chores?	High	79	66.9
	Low	39	33.1
Are you happy with what parents or guardians offered to you? E.g. Buying cloth, books, and support in studying.	Yes	102	86.4
	No	16	13.6

5.2 Socio-demographic characteristics of the families of children with epilepsy for more than 6 months and who are on follow up at seizure follow up clinic of JUMC, 2022.

Among the attendants, majority of them were male (80, 67.8%). The mean age of the fathers was 47.19±8.891 and that of the mothers was 37.30±7.011. Almost two third (82, 69.5%) of the parents were married. 43(36.4%) of both fathers and mothers attended primary education. 54(45.8%) of fathers are engaged on agricultural works and only 23(19.5%) of mothers have no occupation other than child caring (Table 3).

Table 3: Socio-demographic characteristics of the families of children with epilepsy for more than 6 months and who are on follow up at seizure follow up clinic of JUMC, 2022

Variables		Frequency	Percent
Sex of the attendant	Male	80	67.8
	Female	38	32.2
Age of Father	25-34 yrs	22	18.6
	35-44 yrs	35	29.7

	45-54 yrs	38	32.2
	≥55 yrs	23	19.5
Age of Mother	<24 yrs	6	5.1
	25-34 yrs	31	26.3
	35-44 yrs	58	49.2
	45-54 yrs	20	16.9
	≥55 yrs	3	2.5
Marital status of parents	Single	11	9.3
	Married	82	69.5
	Divorced	11	9.3
	Separated	8	6.8
	Widowed	6	5.1
Educational status of father	Not attending formal education	36	30.5
	Primary (1-8)	43	36.4
	Secondary (9-10)	7	5.9
	Preparatory (11-12)	5	4.2
	Technical and vocational	14	11.9
	College and above	13	11.0
Educational status of mother	Not attending formal education	38	32.2
	Primary (1-8)	43	36.4
	Secondary (9-10)	6	5.1
	Technical and vocational	9	7.6
	College and above	10	8.5
Father or guardian occupational status	Professional	12	10.2
	Service and sales worker	14	11.9
	Skilled agricultural, forestry workers	54	45.8
	Craft and related trades workers	17	14.4

	Elementary occupations	10	8.5
Employment status of mother	Yes	23	19.5
	No	95	80.5
Mother or guardian occupational status	Professional	3	2.5
	Service and sales worker	3	2.5
	Skilled agricultural, forestry workers	2	1.7
	Craft and related trades workers	3	2.5
	Elementary occupations	5	4.2
How often the fathers attend religious services	Daily	69	58.5
	2-6 days /week	33	28.0
	Weekly	16	13.6
How often the mothers attend religious services	Daily	54	45.8
	2-6 days /week	43	36.4
	Weekly	14	11.9
	On holidays	7	5.9
Number of people in the house	1-3 peoples	8	6.8
	4-5 peoples	27	22.9
	> 5 peoples	83	70.3
Family monthly income	<600	34	28.8
	601-1650	46	39.0
	1651-3200	21	17.8
	3201-5250	14	11.9
	5251-7800	1	.8
	7801-10900	2	1.7

69(58.3%) and 54(45.8%) of fathers and mothers often attended religious services daily respectively. The mean number of people residing in the household was 6.46 ± 1.942 . **However, more than two third (83, 70.3%) of the parents live in a household with family member of more than 5. More than half of them have monthly income of <1600 birr (Table 4).**

Among the children in the study more than half (66, 55.9%) of them were delivered at home and Majority (111, 94.1%) of them were delivered at term. 19(16.1%) of the children developed complication during delivery, of these, 10(8.5%) developed asphyxia. 68(57.6%) of them exclusive breast feed for the first six months. 26(22%) of the children have known family history of mental illness (Table 4).

Table 4: Clinical and biological characteristics of children with epilepsy for more than 6 months and who are on follow up at seizure follow up clinic of JUMC, 2022.

Variables		Frequency	Percent
Known family history of mental illness	Yes	26	22.0
	No	92	78.0
Place of child delivery	Health institution	52	44.1
	Home	66	55.9
GA child delivered	pre-term	7	5.9
	Term	111	94.1
Complication during delivery	Yes	19	16.1
	No	99	83.9
Types of complication	Prolonged labor	5	4.2
	Loss of consciousness or seizure	4	3.4
	Asphyxia	10	8.5
How long was your child breast feed exclusively?	For 6 months	68	57.6
	< 6 months	45	38.1
	> 6 months	5	4.2

5.4 Disease and treatment related characteristics of children with epilepsy for more than 6 months and who are on follow up at seizure follow up clinic of JUMC, 2022.

The majority (98, 83.1%) of the children in the study-have generalized seizure and (51, 43.1%) of them were diagnosed between six months to one year of age. Mean age at diagnosis and mean duration of illness was 5.35+3.934 and 6.79 +3.939 in years respectively. 85(72%) of them had normal anthropometric measurement. Comorbid illness was identified in 12(10.2%) children, of those 3(2.5%) of them had GDD. Almost all of them had regular follow up 116 (98.3) and

76(64.4%) of them had more than one seizure attack in the past 6 months. Half of them 60(50.8%) were on monotherapy treatment, of those 61(51.7%) was phenytoin. 11(9.3%) discontinued their medication in the last one month (Table 5).

Table 5: Disease and treatment related characteristics of children with epilepsy for more than 6 months and who are on follow up at seizure follow up clinic of JUMC, 2022.

Variables		Frequency	Percent
Diagnosis	Focal seizure	18	15.3
	Generalized seizure	98	83.1
	Other(one absence and one atonic seizure)	2	1.7
Age at first diagnosed	At birth and less than a month	12	10.2
	1 month to 6 months	8	6.8
	6 months to 1 year	51	43.2
	greater than 1 one year	47	39.8
Duration of Illness	0-3 years	32	27.1
	4-7 years	35	29.7
	8-14 years	46	39.0
	>=15 years	5	4.2
Anthropometry	Normal	85	72.0
	Moderate wasting	22	18.6
	severe wasting	11	9.3
Comorbid illness	Yes	12	10.2
	No	106	89.8
Types of comorbidity	ADHD	2	1.7
	cerebral palsy	2	1.7
	CRVH	1	.8
	DM	1	.8
	Dyspepsia	1	.8
	GDD	3	2.5

	GDD + CHD	1	.8
	RVI	1	.8
Regular follow-up for comorbidity	Yes	116	98.3
	No	2	1.7
Seizure frequency in one month over the past 6 months	No seizure	42	35.6
	More than one episode of seizure	76	64.4
Number of medications receiving	only 1 medication	60	50.8
	two and above medication	58	49.2
Type of medication receiving	Phenobarbitone	3	2.5
	Phenytoin	61	51.7
	Carbamazepine	1	.8
	phenytoin and phenobarbitones	48	40.7
	phenobarbitone and carbamazepine	3	2.5
	phenytoin and valproic acid	2	1.7
Any time you have discontinued your medication for the last one month	Yes	11	9.3
	No	107	90.7

5.5 Characteristics of substance use, suicide ideation or attempt and head injury among children with epilepsy for more than 6 months and who are on follow up at seizure follow up clinic of JUMC, 2022.

Regarding substance use, only 7(7.6%) children used substance in the last three months and all of them used khat once or twice a week. Of the total study participants, 2(1.7%) of them thought previous history of suicidal attempt, and 4(3.4%) of them had history of head injury (Table 6).

Table 6: Characteristics of substance use, suicide ideation or attempt and head injury among children with epilepsy for more than 6 months and who are on follow up at seizure follow up clinic of JUMC, 2022.

Variables		Frequency	Percent
Any substance in the last three months	Yes	7	7.6
	No	111	94.1

Types of substance used (Khat)	Yes	7	7.6
	No	111	94.1
Duration of substance used	Once or twice a week	4	3.4
	Weekly	3	2.5
Previous history of suicidal attempt	Yes	2	1.7
	No	116	98.3
History of head injury	Yes	4	3.4
	No	114	96.6

Child Temperament

Regarding the temperament of child, fifty-eight (49.2%) of them have abnormal speech, 51(43.2%) sleep badly, only 5(4.2%) of them run from home frequently, 7(5.9%) steal things from home, 12(10.2%) get scared and nervous for no reason, 21(17.8%) slow to learn, 28(23.7%) isolated them self or not play with other children, and 34(28.8%) wet or soil him /herself (Table 7).

Table 7: Child temperament characteristics among children with epilepsy for more than 6 months and who are on follow up at seizure follow up clinic of JUMC, 2022.

Variables		Frequency	Percent
Any way abnormal in child's speech	Yes	58	49.2
	No	60	50.8
child sleep badly	Yes	51	43.2
	No	67	56.8
child ever have fit or fall to the ground for no reason	Yes	10	8.5
	No	108	91.5
child suffer from frequent headache	Yes	10	8.5
	No	108	91.5
child run away from home frequently	Yes	5	4.2
	No	113	95.8

Child steal things from home	Yes	7	5.9
	No	111	94.1
child get scared or nervous for no good reason	Yes	12	10.2
	No	106	89.8
child in any way appear back ward or slow to learn as compared	Yes	21	17.8
	No	97	82.2
child nearly never play with other children	Yes	28	23.7
	No	90	76.3
child wet or soil him /herself	Yes	34	28.8
	No	84	71.2

5.6 Magnitude of anxiety, depression, and both anxiety and depression among children with epilepsy for more than 6 months and who are on follow up at seizure follow up clinic of JUMC, 2022.

Out of 118 children screened, 36(30.5%) of them had anxiety and 20(16.9%) of them had depression while both anxiety and depression was identified in 9(7.6%) % of children

(Figure 2).

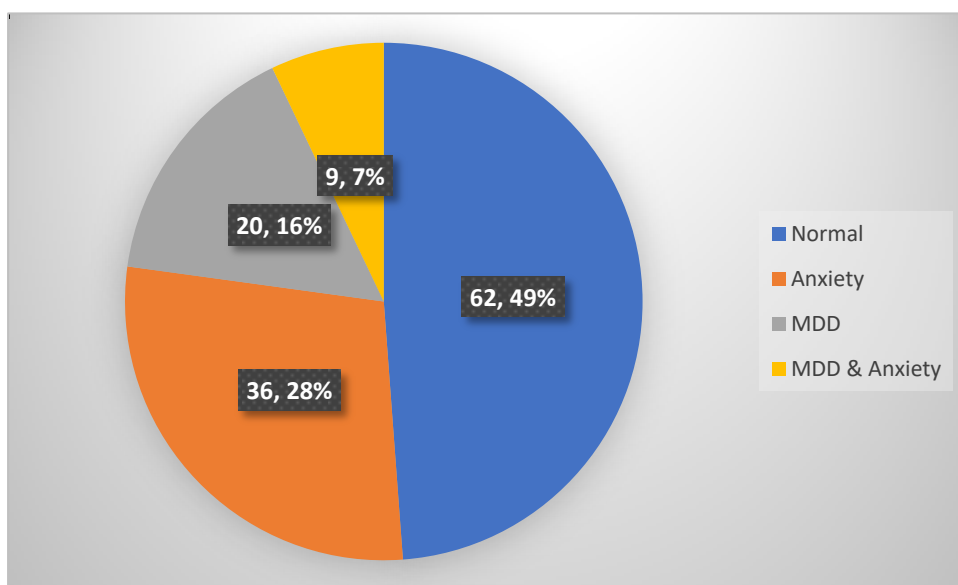


Figure 2: Pie chart shows subscale of anxiety, depression, and both anxiety and major depressive disorder among children with epilepsy for more than 6 months and who are on follow up at seizure follow up clinic of JUMC, 2022.

Of the total anxiety disorder, 21(17.8%) of them have generalized anxiety disorder with the mean score of 11.9407 ± 5.29359 , 3(2.5%) of them had social phobia with mean score of 16.6864 ± 5.64127 , 9(7.6%) of them had separation anxiety disorder with the mean score of 13.2712 ± 5.34240 , and no one developed obsessive compulsive disorder (Table 8).

Table 8: Subscales of anxiety among children with epilepsy for more than 6 months and who are on follow up at seizure follow up clinic of JUMC, 2022.

Variables		Frequency	Percent	Mean (SD)
General Anxiety	Normal	97	82.2	11.9407 ± 5.29359
	GAD	21	17.8	
social phobia	Normal	115	97.5	16.6864 ± 5.64127
	SP	3	2.5	
Separation Anxiety	Normal	109	92.4	13.2712 ± 5.34240
	SA	9	7.6	
Panic disorder	Normal	115	97.5	$10.9576(3.21693)$
	PD	3	2.5	

5.7 Factors associated with anxiety and depression among children with epilepsy for more than 6 months and who are on follow up at seizure follow up clinic of JUMC, 2022

The bivariate binary logistic analysis was conducted and the following variables were made candidates for the multivariate regression such as Age of children, Sex of child , area of residence of child , with whom do child live, birth order of child, relationship of child mother and father , place of child delivered, family expectation on child support parents on home chores, family expectation on academic performance of child, negative experience in life, If child was happy with what parents do or buy for child, employment status of father & mother, Educational status of father & mother, Sex of child attendant, child use of substance, gestational age at child delivered, age at first diagnosis, seizure frequency in last 6 months , number of prescribed medication, if ever child discontinued medication for the last one month, and duration of illness at p-value less than 0.25.

Table...bivariate analysis for factors associated with ..

An adjusted multivariate logistic analysis revealed Age at first diagnosis and number of medications child currently taking was statistically significant association with anxiety, sex of child was statistically significant with major depressive disorder and age of child and R/ship between mother and father or guardians was significantly associated with both anxiety and depression.

The odds of being first diagnosed at 6 months up to 1 year was 95.8% less likely to develop anxiety compared with those first diagnosed greater than one year (AOR; 0.042, CI; 0.004, 0.400, P=0.006). The odds of being taking monotherapy was 90.2% times less likely develop anxiety as compared with those who take polytherapy (AOR; 0.098, CI; 0.028, 0.345, P=0.001).

Factors associated with depression is being the odds male was 5 times more likely to have depression as compared with being female AOR= 5.392, CI: 1.121, 25.947; P= 0.036), similarly, the odds of being age less than 14 was 80.2% less likely to develop anxiety and depression at a time as compared with age greater than 14 years old (AOR= 0.198, CI: 0.041, 0.960, P= 0.044). Finally, the odds of being have a good relationship between mother and father or guardians was 88.6% less likely to develop anxiety and depression as compared to poor relationship between mother and father or guardians (AOR = 0.114, CI: 0.016, 0.819, P = 0.031 (Table 9).

Table 9: Factors associated with anxiety and depression among children with epilepsy for more than 6 months and who are on follow up at seizure follow up clinic of JUMC, 2022.

	Variables		COR 95% C.I.	AOR 95% C.I.
Anxiety	Age at Diagnoses	Birth - 1 month	3(0.38, 23.679)	1.822(0.159, 20.909)
		1 month - 6 months	0.475(0.088,2.577)	0.21(0.028, 1.603)
		6 month - 1 year	0.139(0.022,0.887)	0.042(0.004, 0.400)
		≥ 1 one year	1	1
	No of medications receiving	Only 1 medication (AED)	0.132(0.052,0.339)	0.098(0.028, 0.345)
		2 and above medication (AED)	1	1
Major depressive	Sex of child	Male	5.013(1.380,18.209)	5.392(1.121,25.947)
		Female	1	1
Anxiety & depression	Age of child	<14 yrs. Old	0.226(0.056, 0.907)	0.198(0.041, 0.960)
		>14 yrs. Old	1	1
	Relationship between mother and father or guardians	Good	0.093(0.016,0.552)	0.114(0.016, 0.819)
		Intermediate	0.259(0.043, 1.574)	0.439(0.054, 3.578)
		Poor	1	1

CHAPTER SIX

DISCUSSION

Children with epilepsy (CWE) are observed to have increased incidence of psychiatric disorders as compared to the normal population as well as with children having other chronic diseases not involving the CNS. Population based studies from developed countries confirm at least 30% of CWE have a concomitant psychiatric diagnosis [10, 30, 31]. In developed countries clinic-based studies shows, the prevalence of anxiety in children with epilepsy is around 30 to 35%, while the prevalence of depression is near 12.7 to 36.5%. Unfortunately, however, these conditions are often unrecognized and left untreated in children with epilepsy, which can lead to negative outcomes on quality of life [15]. Another population based studies in developed countries have revealed a prevalence of lifetime depression in epilepsy of almost 13-20% [16].

The current study shows 36(30.5%) of the children had anxiety, and 20(16.9%) of them have depression while and both anxiety and depression identified in 9(8%) % of children. This study shows similar range of result with clinic based study done in developed countries on magnitude of each children to have anxiety and depression [15].

Cross-sectional study was done to assess prevalence of depression and anxiety among children with epilepsy and determines which demographic variables and comorbidities increase the risk of these psychopathologies in 2009 to 2010, in New York, USA. 1,042 children aged 5-17 year were included in the study. The screen was done by asking parent/guardian for presence of depression and the presence of anxiety. The study showed 13.1 % have depression and 23.3 % have anxiety while 11.5% for both. In this study, the prevalence children with both anxiety and depression was near to our study while magnitude of each anxiety and depression was lower than current study this may due to varying methodologies and larger sample size.

Cross-sectional study on children with epilepsy aged 7 to 17 years attending neurology clinic at Yalagdo Ouedraogo University Teaching Hospital, Burkina Faso, during the period of May 06 to August 6, 2019. The State-Trait Anxiety Inventory for Children French version (STAI-C) was used for the assessment of anxiety and the Child Depression Inventory scale translated into French (CDI) for the assessment of depression. 45 children with epilepsy were included in the study, and mean age was 10.86 ± 3.30 years. 27 (60%) children were boys. Anxiety disorders were present in 19 (42.2%) patients and depression was present in 12 patients (26.7 [17]). Compared to current study prevalence of each of anxiety and depression was higher, that may be due small sample size and different screening tool.

The current study also shows same magnitude of depression 16.9(20/118) with cross-sectional study done in 2018, at the Pediatric Neurology Department of the West China Women's and Children's Hospital,

China that prevalence of depression among children with epilepsy was 16.9% (21/124) [27] and magnitude of depression is in the range of study done in our side with study done at Department of Pediatric Neurology, Ancona Italy, in 2019, Of 143 adolescents were involved and they were screened by Neurological Disorders Depression Inventory for Epilepsy (NDDI-E) questionnaires. The prevalence of depressive disorders in adolescents with epilepsy ranges between 8 and 35% and is higher than the general population of the same age [16].

The magnitude of anxiety disorder in current study (30.5%) is in agreement with study done in Nigeria, which was 29 (28.43%), but magnitude of the depression was higher 29 (28.43%) [18], than current study 20(16.9). Differences in methods of diagnosing depression may be responsible for the differences.

Another cross-sectional study done at Tuen Mun Hospital in Hong Kong, in 2015. Total of 140 adolescents (71 boys and 69 girls) aged 10 to 18 years were recruited from patients who attended the neurology outpatient clinic. The assessment was done by Hospital Anxiety and Depression Scale Anxiety Subscale, of which 32.8% had anxiety and 22.1% had depression [26]. In this study magnitude of anxiety is almost all near similar with current study (30.5%), And that of depression is higher than current study this may due to different method used for screening the disease.

In current study The odds of being first diagnosed within first 1 year was 95.8% less likely to develop anxiety compared with those first diagnosed greater than one year (AOR; 0.042, CI; 0.004, 0.400, P=0.006). The odds of being taking monotherapy was 90.2% times less likely develop anxiety as compared with those who take polytherapy (AOR; 0.098, CI; 0.028, 0.345, P=0.001). Indirect relationship to current study the study done in Hong Kong, in 2015 showed anxiety were associated with older age at the time of the study and polytherapy [26]. The fact that being monotherapy treatment may decrease multiple drug side effect in polytherapy and patient anxiety due to pill burden in polytherapy is decreased monotherapy.

Factors associated with depression is being the odds male was 5 times more likely to have depression as compared with being female AOR= 5.392, CI: 1.121, 25.947; P= 0.036). Unlike to study done in in Hong Kong, in 2015 which showed female gender and younger age of seizure onset were associated with depression [26], the current study showed males were develop depression, this may due to age number difference between samples and methodology used for screening. The current study also shows odds of being age less than 14 was 80.2% less likely to develop anxiety and depression at a time as compared with age greater than 14 years old (AOR= 0.198, CI: 0.041, 0.960, P= 0.044). The fact is that adolescence is a peculiar neurodevelopmental period marked by rapid and profound changes in various domains such as biological, social, and psychological domains. Coping with these rapid changes could be challenging. The prevalence of depressive disorders in adolescents especially above fifteen years old with epilepsy is higher than the general population at the same age [16], which those less than 14 years developed depression less likely than above 14 years as in the current study.

The odds of being have a good relationship between mother and father or guardians was 88.6% less likely to develop anxiety and depression as compared to poor relationship between mother and father or guardians (AOR = 0.114, CI: 0.016, 0.819, P = 0.031). This is due to smooth relationship between parent is one of the preventive factor of anxiety and depression [32, 34]. The study done in Hong Kong, in 2015 [26] and cross-sectional study on children with epilepsy aged 7 to 17 years in Burkina Faso in, August 6, 2019, showed long duration of epilepsy was associated with anxiety and depression [17], but in current study it study duration of epilepsy was associated but not statically significant.

LIMITATION OF THE STUDY

The study population selected may be less representative of majority of children having epilepsy because those less than 8 years old are not assessed due parental part of screening tool validation delayed, even those age included didn't come follow up with parents or care givers due to social reason.

CHATER SEVEN

CONCLUSION AND RECOMMENDATION

CONCLUSION

This study has found out that significant number of CWE under our care also have a co morbid behavioral disorders. If untreated, these problems will affect the quality of life as well as their productivity. The predictors are mainly biological factors like (treatment) (AED number) and family factors are also of significance. It also will disrupt the harmony of their family and result in tremendous social and economic crisis. Physicians attending to these adolescents should therefore carefully evaluate

them with respect to the possible risk factors. This can easily be minimized by regular assessment and addressing the problem early.

RECOMMENDATION

Children with epilepsy as shown in the study are at significant risk for co morbid psychiatric problems. Regular screening of the children and linking them to psychiatric services would be of paramount importance in improving their future.

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9. ANNEX

Consent forms

Consent form English Version

I have been informed about this study’s purpose, procedures, possible benefits and risks, and the use and disclosure of my child’s health care information from this research. I have read and understood this consent form, and have been given the opportunity to ask any questions I may have. All my questions have been answered to my satisfaction. I freely give my consent for my child to participate in this research study. I authorize the use and disclosure of my child’s health information to the parties listed in the authorization section of this consent for the purposes described above. By signing this consent form I have not waived any of the legal rights to which my child is otherwise entitled. You will be provided with a signed copy of this form.

CONSENT SIGNATURE

Printed name of Child _____

Child’s Date of Birth (dd-MMM-yyyy)

Printed name of Parent/Legal Guardian _____

Relationship to Child _____

Signature of Parent/Legal Guardian _____ Date

PERSON OBTAINING CONSENT

I attest that the requirements for informed consent for this research project described in this form have been satisfied that I have discussed the research project with the participant’s parent or guardian and explained to him or her in nontechnical terms all of the information contained in this informed consent form, including any risks or adverse reactions that may reasonably be expected to occur. I certify that the information provided was given in a language that was understandable to the participant’s parent or guardian. I further certify that I encouraged the parent or legal guardian to ask questions and that all questions asked were answered.

Printed name of Person Obtaining Consent

Signature of Person Obtaining Consent

Information sheet English Version

Introduction: The purpose of this research study is to assess **the link epilepsy and selected mental illnesses among children and adolescents being treated in Jimma University Medical Center**. When your child is a research participant, the principal investigator and the study staff will follow the rules of the research study protocol. Your child is being asked to voluntarily take part in a research study. You do not have to allow your child to participate if you do not want your child to participate. Before choosing to allow your child to be a part of this study, you need to read this Information and Consent Form.

This form tells you what will happen during the study and the risks and benefits for your child if you choose to allow him/her to take part in this study. It explains the other choices your child has besides taking part in this study. The form also explains you and your child's right to stop taking part in the study at any time. If you agree to allow your child to participate in this study, assent (agreement) will also be obtained from your child.

This consent form may contain words that you do not understand. Please ask the principal investigator or study staff to explain any words or information that you do not clearly understand. Your questions should be answered clearly and to your satisfaction. Before you make a decision to allow your child to participate, we want you to understand the information in this form.

Sometimes, during a study, we may learn of new information which may make a difference in whether you want your child to continue to participate. If we learn of any information, we will let you and your child know as soon as possible.

Potential benefits

Your child will not receive any direct benefit from participating in this study. No promise can be made concerning the study outcome, because results from a clinical research study cannot be predicted.

Alternative methods/treatments

This study is voluntary. You may decide at any time to withdraw your child from participation in this study.

Voluntary participation and withdrawal from the research

Your child's participation is voluntary. You may refuse to allow your child to participate for any reason at any time, without penalty or loss of benefits to which your child is otherwise entitled. If your child withdraws from the study you must return all study-related supplies to the study staff. You may withdraw your child from the study by contacting the study staff. If your child leaves the study before the regularly scheduled visit, you may be asked by the study staff to make a final visit for some end of study procedures. This is to make sure that there are no safety concerns to discuss with the principal investigator and to maintain the integrity of the research study.

Confidentiality

Your child's identity and your child's personal records will be kept confidential to the extent permitted by the applicable laws and/or regulations and will not be made publicly available. If results of this study are published or presented at a conference, your identity will not be revealed. Confidentiality will be maintained during and after your participation in this study.

Signature of the participant Date

Signature of the data collector Date

Contact the principal investigator if there is any problem or clarification needed with phone no +251912353034

Section 1. Questionnaire from chart and Children and adolescents

1. Age (current) _____(in years)
2. Sex
1. Male 2. Female
3. Educational status
1. Not attending formal education
2. Primary(1-8)
3. Secondary(9-10)
4. Preparatory(11-12)
5. Technical and vocational
(10+1,10+2,10+3)
4. College and above
- 4 What was your score in the first semester? Please write your average score in number. _____
5. Where is your area of residence
1. Urban
2. Rural
6. District
1. Jimma town
2. Outside Jimma town(state the woreda)_____
7. With whom do you live?
1. With parents
2. With Guardians
3. Alone
8. Are you the only child for your family
1. Yes
2. No
9. If your answer is No for question number 9, what is your birth order? _____
10. How often do you attend religious services?
1. Daily
2. 2-6 days /week
3. Weekly
4. Only to holidays

5. Never attended
11. Do you have negative experience in your life? E.g. sexual, physical, emotional.....
12. If yes for question number 12, which one
13. How your relationship does looks like with your brother, sisters or guardian' s children?
14. How your relationship does looks like with your father or guardians?
15. How your relationship does looks like with your mother or guardians?
16. How the relationship between your mother and father or guardians look likes?
17. How much your parent or guardians expect from you?
 17A. Self care_____
- 17B. Academic performance_____
- 17C. To support parents on household chores_____
18. Are you happy with what parents or guardians offered to you? E.g. Buying cloth, books, and support in studying.
- Section 2. Questionnaire from Parents**
19. Sex of the attendant
20. Age of father _____(in years)
21. Age of mother _____(in years)
22. Marital status of parents
1. Yes
2. No
1. Sexual
2. Physical.
3. Others (specify).....
1. Good
2. Intermediate
3. Poor
4. No relationship
1. Good
2. Intermediate
3. Poor
4. No relationship
1. Good
2. Intermediate
3. Poor
4. No relationship
1. Supportive, loving
- 2.Only supportive
3. Quarreling
4. Write if other.....
1. High 2. Low 3. No expectation
2. High 2. Low 3. No expectation
3. High 2. Low 3. No expectation
1. Yes
2. No
1. Male
2. Female
1. Single

2. Married
 3. Divorced
 4. Separated
 5. Widowed
23. Educational status of father
1. Not attending formal education
 2. Primary(1-8)
 3. Secondary(9-10)
 4. Preparatory(11-12)
 5. Technical and vocational
 - a. (10+1,10+2,10+3)
 6. College and above
24. Educational status of mother
1. Not attending formal education
 2. Primary(1-8)
 3. Secondary(9-10)
 4. Preparatory(11-12)
 5. Technical and vocational
 - a. (10+1,10+2,10+3)
 6. College and above
25. Employment status of father
1. Has job
 2. No job
26. If 1 to Q 25 father' s or guardian' s occupational status
1. Managers
 2. Professionals
 3. Technician and associate professionals
 4. Clerical support workers
 5. Service and sales worker
 6. Skilled agricultural , forestry and fishery workers
 7. Craft and related trades workers
 8. Plant and machine operators, and assemblers
 9. Elementary occupations
 10. Armed forces occupation
27. Employment status of mother
1. Has job
 2. No job

28. If 1 to Q 27 mother' s or guardian' s occupational status
1. Managers
 2. Professionals
 3. Technician and associate professionals
 4. Clerical support workers
 5. Service and sales worker
 6. Skilled agricultural, forestry and fishery workers
 7. Craft and related trades workers
 8. Plant and machine operators, and assemblers
 9. Elementary occupations
 10. Armed forces occupation
29. How often the fathers attend religious services?
1. Daily
 2. 2-6 days /week
 3. Weekly
 4. Only to holidays
 5. never attended
30. How often the mothers attend religious services?
1. Daily
 2. 2-6 days /week
 3. Weekly
 4. Only to holidays
 5. never attended
31. Total number of people residing in the household including relatives _____
32. Income
1. Father regular income)_____ETB
 2. Father additional income(if any)_____ETB
 3. Mother regular income -----ETB
 4. Mother additional income(if any)_____ETB
 5. Total income
33. Do you have known family history of mental illness
1. Yes
 2. No

34. Where was the child delivered?
1. Health institution
 2. Home
-
35. At what gestational age was your child delivered?
-
36. Any complication during delivery?
1. Yes
 2. No
37. If yes to Q 36 List them
1. Excess bleeding
 2. Prolonged labor
 3. Loss of consciousness or seizure
 4. Asphexia
 5. Others
38. For how long was your child breast fed exclusively?
1. 6 month
 2. < 6 month
 3. > 6 month
- Section 3: Clinical data**
39. Diagnosis
1. Focal seizure
 2. Generalized seizure
 3. Unclassified seizure
40. Age at first diagnosis
-
41. Duration of illness
-
42. Anthropometry
1. Weight
 2. Height
 3. BMI _____
43. Are there comorbid illness?
1. Yes
 2. No
44. If yes which type of comorbid condition is/are having?
-
45. Are you having regular follow-up
1. Yes
 2. No
46. Seizure frequency in one month over the past 6 month
-
47. How many medication you are receiving
-
48. Type of medication you are taking(the most recent)
1. Phenobarbitone
 2. Phenytoin
 3. Valproic acid
 4. Carbamazepine
 5. Others (specify) to be filled by the data collector from patient card

49. Were there any time you have discontinued your medication for the last one month
1. Yes
2. No
- Section 4. substances use and suicide from Children and adolescents**
50. Have you ever use any substance
1. Yes 2. No
51. Do you use any substance in the last three months?
1. Yes 2. No
52. If Yes for the above questions, what types of substance do you use? Might have more than one answer
1. Khat
2. Alcohol
3. Cigarette
4. Cannabis
5. Shisha
6. Others (specify)
53. Frequency of substance use
1. Daily
2. Once or twice a week
3. Weekly
4. Monthly
5. Other
54. Do you have Previous history of suicidal attempt
1. Yes
2. No
55. History of head injury
1. Yes
2. No

Section 5. Revised Child Anxiety and Depression Scale (RCADS) to screen Anxiety and Depression in children and adolescent, age from 8-18 CHILD Version

Instructions: For each item, please mark the box for Never, Sometimes, Often and Always. It would help us if you answered all items as best you can even if you are not absolutely certain.

Please put a circle around the word that shows how often each of these things happens to you. There are no rights or wrong answers.

No	Questions	Never (0)	Some- times(1)	Often (2)	Always (4)
1	I worry about things	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	I feel sad or empty	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

3	When I have a problem, I get a funny feeling in my stomach	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4	I worry when I think I have done poorly at something	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5	I would feel afraid of being on my own at home	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6	Nothing is much fun anymore	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7	I feel scared when I have to take a test	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8	I feel worried when I think someone is angry with me	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9	I worry about being away from my parents	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10	I get bothered by bad or silly thoughts or pictures in my mind	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11	I have trouble sleeping	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12	I worry that I will do badly at my school work	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13	I worry that something awful will happen to someone in my family	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14	I suddenly feel as if I can't breathe when there is no reason for this	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15	I have problems with my appetite	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16	I have to keep checking that I have done things right (like the switch is off, or the door is locked)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
17	I feel scared if I have to sleep on my own	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
18	I have trouble going to school in the mornings because I feel nervous or afraid	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
19	I have no energy for things	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20	I worry I might look foolish	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
21	I am tired a lot	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
22	I worry that bad things will happen to me	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
23	I can't seem to get bad or silly thoughts out of my head	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

24	When I have a problem, my heart beats really fast	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
25	I cannot think clearly	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
26	I suddenly start to tremble or shake when there is no reason for this	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
27	I worry that something bad will happen to me	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
28	When I have a problem, I feel shaky	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
29	I feel worthless	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
30	I worry about making mistakes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
31	I have to think of special thoughts (like numbers or words) to stop bad things from happening	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
32	I worry what other people think of me	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
33	I am afraid of being in crowded places (like shopping centers, the movies, buses, busy playgrounds)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
34	All of a sudden I feel really scared for no reason at all	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
35	I worry about what is going to happen	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
36	I suddenly become dizzy or faint when there is no reason for this	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
37	I think about death	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
38	I feel afraid if I have to talk in front of my class	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
39	My heart suddenly starts to beat too quickly for no reason	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
40	I feel like I don' t want to move	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
41	I worry that I will suddenly get a scared feeling when there is nothing to be afraid	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
42	I have to do some things over and over again (like washing my hands, cleaning or putting things in a certain order)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
43	I feel afraid that I will make a fool of myself in front of people	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

44	I have to do some things in just the right way to stop bad things from happening	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
45	I worry when I go to bed at night	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
46	I would feel scared if I had to stay away from home overnight	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
47	I feel restless	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Section 6. Temperament

CHILD'S QUESTIONNAIRE FORMAT (ROC)

- | | Yes | No |
|---|-----|----|
| 1 Is your child's speech in any way abnormal | | |
| 2 Did the child sleep badly | | |
| 3 Did the child ever have fit or fall to the ground for no reason | | |
| 4 Did the child suffer from frequent headache? | | |
| 5 Does the child run away from home frequently | | |
| 6 Does the child steal things from home | | |
| 7 Does the child get scared or nervous for no good reason? | | |
| 8 Does the child in any way appear back ward or slow to learn as compared with other children of about the same age | | |
| 9 Does the child nearly never play with other children? | | |
| 10 Does the child wet or soil him /herself? | | |

Interpretation of Revised child Anxiety and Depression Scale (RCADS) score

To score the RCADS, each item is assigned a numerical value from 0-3, where 0= Never, 1 = Sometimes, 2 = Often, and 3 = Always. For each subscale add the numerical values for each item together. The items that comprise each subscale are listed below.

Social Phobia: Item 4, 7, 8, 12, 20, 30, 32, 38, 43

Panic Disorder: Item 3, 14, 24, 26, 28, 34, 36, 39, 41

Major Depression: Item 2, 6, 11, 15, 19, 21, 25, 29, 40, 47

Separation Anxiety: Item 5, 9, 17, 18, 33, 45, 46

Generalized Anxiety: Item 1, 13, 22, 27, 35, 37

Obsessive-Compulsive: 10,16, 23, 31, 42, 44

For example, for Generalized Anxiety you would add the numerical values for items 1, 13, 22, 27, 35, and 37. Thus, the highest score possible is 18, the lowest 0. Missing data for raw scores can be handled by prorating the remaining items within a scale. It is recommended that scales with more than 2 missing items are not scored. Likewise, the total anxiety score can have up to 10 missing items, but only if each subscale has no more than 2 missing; and the total anxiety and depression score can have up to 12 missing items, but only if each subscale has no more than 2 missing items. To estimate the scale score, take the sum of the completed items within that scale and divide that by the number of items completed, then multiple by the total number of items in that scale, and then round the result. For example, if one item is missing from the separation anxiety scale (which has seven items), and the 6 completed items sum to 4, you would divide 4 by 6 (0.67), and then multiply by 7, which would yield 4.67, which then rounds to 5. Thus, you would count the score as a 5 not a 4 because of the prorating [37].

Clinical Cut-Off T-scores

Clinical cut-off scores can help determine next steps in the young person's treatment plan.

T score	Meaning	Clinical Implication
T-score below 65	Normal range	No referral to treatment indicated, unless clinical judgment suggests otherwise
T-score between 65 and 69	Borderline clinical range	Clarify need for referral by doing a more thorough assessment or by using clinical judgment
	Only 6% of youth in the general population have T-scores of 65 or	

	higher.	
T-score 70	Clinical range	Referral to treatment indicated
or above	Only 2% of youth in the general population have T-scores of 70 or higher.	